Department of Natural Resources
Minerals, Policy and Planning Division

New Nouveau Brunswick

Ministère des Ressources naturelles
Division des minéraux, des politiques et de la planification

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MAP NR-1 (2008 EDITION)

BEDROCK GEOLOGY OF NEW BRUNSWICK

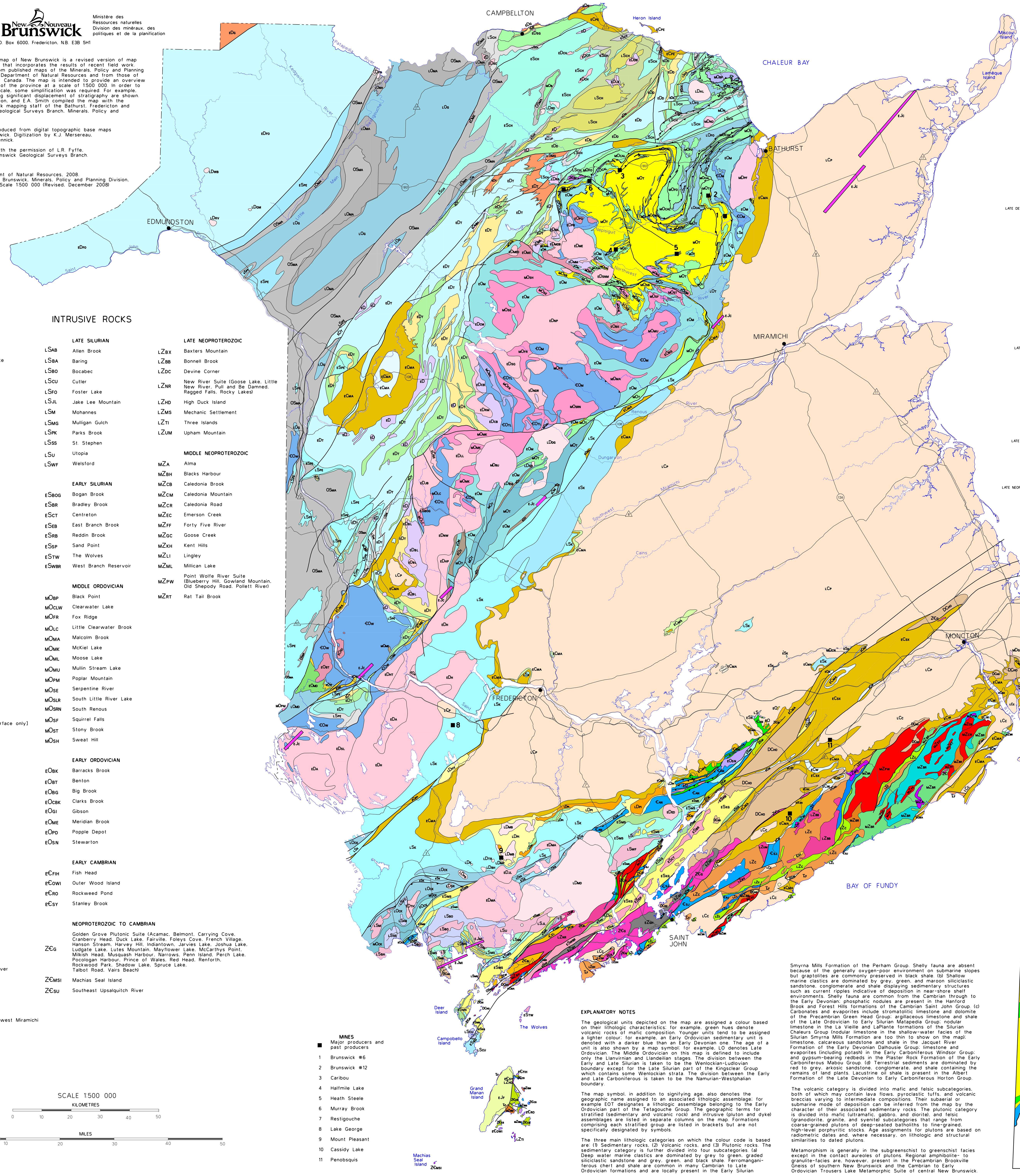
This bedrock geological map of New Brunswick is a revised version of map plate NR-1 (2000 edition) that incorporates the results of recent field work. It has been prepared from published maps of the Minerals, Policy and Planning Division, New Brunswick Department of Natural Resources and from those of the Geological Survey of Canada. The map is intended to provide an overview of the bedrock geology of the province at a scale of 1:500 000. In order to maintain clarity at this scale, some simplification was required. For example, only major faults showing significant displacement of stratigraphy are shown. L.R. Fyffe, S.R. McCutcheon, and E.A. Smith compiled the map with the assistance of the bedrock mapping staff of the Bathurst, Fredericton and Sussex offices of the Geological Surveys Branch, Minerals, Policy and Planning Division.

The base map was reproduced from digital topographic base maps from Service New Brunswick. Digitization by K.J. Mersereau, D.M. Richard, and M.P. Rennick.

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RECOMMENDED CITATION

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LITHOLOGICAL CODE

Age	Deep water marine clastics	Shallow water marine clastics	Carbonates and evaporites	Terrestrial sediments	Volcanic rocks: Mafic	Volcanic rocks: Felsic	Plutonic rocks: Mafic	Plutonic rocks: Felsic
EARLY CRETACEOUS (99 - 145 Ma)				EK				
EARLY JURASSIC (175 - 200 Ma)					EJ		EJ	
TRIASSIC (200 - 251 Ma)				T				
LATE CARBONIFEROUS (300 - 315 Ma)				LC				
EARLY CARBONIFEROUS (315 - 359 Ma)			EC	EC	EC	EC		
LATE DEVONIAN-EARLY CARBONIFEROUS (315 - 385 Ma)				DC	DC	DC		
LATE DEVONIAN (359 - 385 Ma)				LD	LD	LD	LD	LD
MIDDLE DEVONIAN (385 - 397 Ma)								MD
EARLY DEVONIAN (397 - 416 Ma)	ED	ED		ED	ED	ED	ED	ED
LATE SILURIAN (416 - 422 Ma)	LS	LS	LS		LS	LS	LS	LS
EARLY SILURIAN (422 - 443 Ma)	ES	ES	ES		ES	ES	ES	ES
LATE ORDOVICIAN-EARLY SILURIAN (422 - 460 Ma)			OS					
LATE ORDOVICIAN (443 - 460 Ma)	LO		LO		LO	LO		
MIDDLE ORDOVICIAN (460 - 471 Ma)	MO		MO		MO	MO	MO	MO
EARLY ORDOVICIAN (471 - 488 Ma)	EO		EO		EO	EO	EO	EO
LATE CAMBRIAN-EARLY ORDOVICIAN (471 - 501 Ma)	€O							
CAMBRIAN (501 - 542 Ma)	€				€	€	€	€
LATE NEOPROTEROZOIC-EARLY CAMBRIAN (521 - 630 Ma)	Z€	Z€		Z€	Z€	Z€	Z€	Z€
LATE NEOPROTEROZOIC (542 - 630 Ma)	LZ	LZ			LZ	LZ	LZ	LZ
MIDDLE NEOPROTEROZOIC (630 - 850 Ma)		MZ			MZ	MZ	MZ	MZ
EARLY NEOPROTEROZOIC (850 - 1000 Ma)			EZ					

SEDIMENTARY ROCKS — VOLCANIC ROCKS — PLUTONIC ROCKS

INTRUSIVE ROCKS

EARLY JURASSIC
eJc Caraquet Dyke
eJmi Ministers Island Dyke

LATE DEVONIAN
lDal Antinouri Lake
lDbh Beech Hill
lDbm Buttermilk Brook
lDdg Dungarvon
lDel Eagle Lake
lDk Kedron Stream
lDmb McDougall Brook
lDmd Mount Douglas
lDmp Mount Pleasant
lDpa Patapedia River
lDpr Pleasant Ridge
lDqm Quisibis Mountain
lDra Ramsay Brook
lDrd Red Brook
lDrv Rivière Verte
lDsb Sisters Brook
lDsr Sorrel Ridge
lDtr True Hill
lDwb Watson Brook

MIDDLE DEVONIAN
mDbu Burnthill
mDcn Canaan River
mDga Gaytons
mDn Nigadoo
mDnd Nicholas Denys
mDpf Pabineau Falls

EARLY DEVONIAN
eDa Allandale
eDbe Beadle Mountain
eDbl Becaguimec Lake
Bois-Gagnon [subsurface only]
eDch Charlo
eDcm Clark Mountain
eDcb Clearwater Brook
eDdb Dickie Brook
eDed Evandale
eDgl Goodwin Lake
eDht Hartfield
eDh Hawkshaw
eDhp Howard Peak
eDjf Jerry Ferguson
eDjl John Lee Brook
eDjb Juniper Barren
eDlb Landry Brook
eDll Lost Lake
eDma Magaguadavic
eDmk McKenzie Gulch
eDmba Mount Bailey
eDmdb Mount DesBarres
eDmed Mount Edward
eDme Mount Elizabeth
eDml Mount Latour
eDmm Mount Manny
eDnw Nashwaak
eDndr North Dungarvon River
eDnp North Pole Stream
eDpb Portage Brook
eDrm Redstone Mountain
eDsl Skiff Lake
eDsnm South Branch Northwest Miramichi
eDsc Squaw Cap
eDsq Squaw Lake
eDsg Sugarloaf
eDth Tower Hill

LATE SILURIAN
lSab Allen Brook
lSba Baring
lSbo Bocabec
lScu Cutler
lSfo Foster Lake
lSjl Jake Lee Mountain
lSm Mohannes
lSmg Mulligan Gulch
lSpk Parks Brook
lSss St. Stephen
lSu Utopia
lSwf Welsford

EARLY SILURIAN
eSbog Bogan Brook
eSbr Bradley Brook
eSct Centreton
eSeb East Branch Brook
eSrb Reddin Brook
eSsp Sand Point
eStw The Wolves
eSwbr West Branch Reservoir

MIDDLE ORDOVICIAN
mObp Black Point
mOclw Clearwater Lake
mOfr Fox Ridge
mOlc Little Clearwater Brook
mOma Malcolm Brook
mOmk McKiel Lake
mOml Moose Lake
mOmu Mullin Stream Lake
mOpm Poplar Mountain
mOse Serpentine River
mOslr South Little River Lake
mOsrn South Renous
mOsf Squirrel Falls
mOst Stony Brook
mOsh Sweat Hill

EARLY ORDOVICIAN
eObk Barracks Brook
eObt Benton
eObg Big Brook
eOcbk Clarks Brook
eOgi Gibson
eOme Meridian Brook
eOpd Popple Depot
eOsn Stewarton

EARLY CAMBRIAN
e€fih Fish Head
e€owi Outer Wood Island
e€ro Rockweed Pond
e€sy Stanley Brook

NEOPROTEROZOIC TO CAMBRIAN
Z€g Golden Grove Plutonic Suite (Acamac, Belmont, Carrying Cove, Cranberry Head, Duck Lake, Fairville, Foleys Cove, French Village, Hanson Stream, Harvey Hill, Indiantown, Jarvies Lake, Joshua Lake, Ludgate Lake, Lutes Mountain, Mayflower Lake, McCarthys Point, Milkish Head, Musquash Harbour, Narrows, Penn Island, Perch Lake, Pocologan Harbour, Prince of Wales, Red Head, Renforth, Rockwood Park, Shadow Lake, Spruce Lake, Talbot Road, Vairs Beach)
Z€msi Machias Seal Island
Z€su Southeast Upsalquitch River

LATE NEOPROTEROZOIC
lZbx Baxters Mountain
lZbb Bonnell Brook
lZdc Devine Corner
lZnr New River Suite (Goose Lake, Little New River, Pull and Be Damned, Ragged Falls, Rocky Lakes)
lZhd High Duck Island
lZms Mechanic Settlement
lZti Three Islands
lZum Upham Mountain

MIDDLE NEOPROTEROZOIC
mZa Alma
mZbh Blacks Harbour
mZcb Caledonia Brook
mZcm Caledonia Mountain
mZcr Caledonia Road
mZec Emerson Creek
mZff Forty Five River
mZgc Goose Creek
mZkh Kent Hills
mZli Lingley
mZml Millican Lake
mZpw Point Wolfe River Suite (Blueberry Hill, Gowland Mountain, Old Shepody Road, Pollett River)
mZrt Rat Tail Brook

SCALE 1:500 000

KILOMETRES 0 10 20 30 40 50

MILES 0 10 20 30 40 50

MINES

■ Major producers and past producers

1 Brunswick #6
2 Brunswick #12
3 Caribou
4 Halfmile Lake
5 Heath Steele
6 Murray Brook
7 Restigouche
8 Lake George
9 Mount Pleasant
10 Cassidy Lake
11 Penobsquis

EXPLANATORY NOTES

The geological units depicted on the map are assigned a colour based on their lithologic characteristics; for example, green hues denote volcanic rocks of mafic composition. Younger units tend to be assigned a lighter colour; for example, an Early Ordovician sedimentary unit is denoted with a darker blue than an Early Devonian one. The age of a unit is also shown by a map symbol; for example, LO denotes Late Ordovician. The Middle Ordovician on this map is defined to include only the Llanvirnian and Llandeilian stages. The division between the Early and Late Silurian is taken to be the Wenlockian-Ludlovian boundary except for the Late Silurian part of the Kingsclear Group which contains some Wenlockian strata. The division between the Early and Late Carboniferous is taken to be the Namurian-Westphalian boundary.

The map symbol, in addition to signifying age, also denotes the geographic name assigned to an associated lithologic assemblage; for example EOT designates a lithologic assemblage belonging to the Early Ordovician part of the Tetagouche Group. The geographic terms for stratified (sedimentary and volcanic rock) and intrusive (pluton and dyke) assemblages are listed in separate columns on the map. Formations comprising each stratified group are listed in brackets but are not specifically designated by symbols.

The three main lithologic categories on which the colour code is based are: (1) Sedimentary rocks, (2) Volcanic rocks, and (3) Plutonic rocks. The sedimentary category is further divided into four subcategories. (a) Deep water marine clastics are dominated by grey to green, graded siliciclastic sandstone and grey, green, and black shale. Ferromanganiferous chert and shale are common in many Cambrian to Late Ordovician formations and are locally present in the Early Silurian Smyrna Mills Formation of the Perham Group. Shelly fauna are absent because of the generally oxygen-poor environment on submarine slopes but graptolites are commonly preserved in black shale. (b) Shallow marine clastics are dominated by grey, green, and maroon siliciclastic sandstone, conglomerate and shale displaying sedimentary structures such as current ripples indicative of deposition in near-shore shelf environments. Shelly fauna are common from the Cambrian through to the Early Devonian; phosphatic nodules are present in the Hanford Brook and Forest Hills formations of the Cambrian Saint John Group. (c) Carbonates and evaporites include stromatolitic limestone and dolomite of the Precambrian Green Head Group; argillaceous limestone and shale of the Late Ordovician to Early Silurian Matapedia Group; nodular limestone in the La Vieille and LaPlante formations of the Silurian Chaleurs Group (nodular limestone in the shallow-water facies of the Silurian Smyrna Mills Formation are too thin to show on the map); limestone, calcareous sandstone and shale in the Jacquet River Formation of the Early Devonian Dalhousie Group; limestone and evaporites (including potash) in the Early Carboniferous Windsor Group; and gypsum-bearing redbeds in the Plaster Rock Formation of the Early Carboniferous Mabou Group. (d) Terrestrial sediments are dominated by red to grey, arkosic sandstone, conglomerate, and shale containing the remains of land plants. Lacustrine oil shale is present in the Albert Formation of the Late Devonian to Early Carboniferous Horton Group.

The volcanic category is divided into mafic and felsic subcategories, both of which may contain lava flows, pyroclastic tuffs, and volcanic breccias varying to intermediate compositions. Their subaerial or submarine mode of deposition can be inferred from the map by the character of their associated sedimentary rocks. The plutonic category is divided into mafic (ultramafic, gabbro, and diorite), and felsic (granodiorite, granite, and syenite) subcategories that range from coarse-grained plutons of deep-seated batholiths to fine-grained, high-level porphyritic stocks. Age assignments for plutons are based on radiometric dates and, where necessary, on lithologic and structural similarities to dated plutons.

Metamorphism is generally in the subgreenschist to greenschist facies except in the contact aureoles of plutons. Regional amphibolite- to granulite-facies are, however, present in the Precambrian Brookville Gneiss of southern New Brunswick and the Cambrian to Early Ordovician Trousers Lake Metamorphic Suite of central New Brunswick.

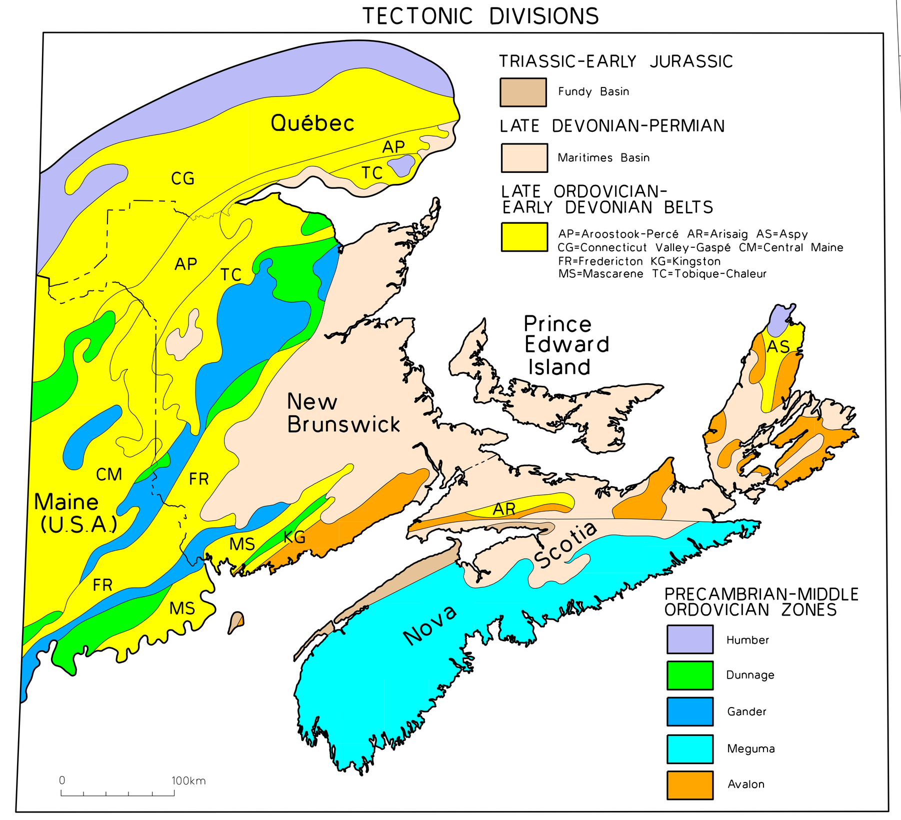
THE APPALACHIAN OROGEN OF THE MARITIME REGION

The tectonic divisions of the Maritime Provinces and adjoining areas, shown in the map inset below, are taken with minor modification from the "Geology of the Appalachian-Caledonian Orogen in Canada and Greenland, 1985". Early Paleozoic and older rocks are divided into five zones reflecting various paleogeographic settings marginal to, and within the early Paleozoic Iapetus Ocean. The Humber Zone is underlain by sedimentary rocks deposited along the Laurentian continental margin of ancient North America; the Dunnage Zone contains tracts of Iapetan island arcs and back-arc basins; the Gander and Meguma zones are underlain by sedimentary sequences deposited off the Gondwanan continental margin, and the Avalon Zone is characterized by Precambrian volcanic rocks overlain by Cambrian rocks containing trilobite fauna of Gondwanan affinity. Rocks of the Dunnage, Gander, and Avalon zones were deformed and successively accreted to the Laurentian continental margin during closure of the Iapetus Ocean.

The middle Paleozoic belts to the northwest of the Avalon Zone contain sedimentary and volcanic rocks deposited mainly in remnant basins remaining after destruction of much of the Iapetus Ocean. Middle Paleozoic belts within the Avalon Zone contain volcanic rocks of island-arc affinity that are likely related to accretion of the Meguma Zone to Laurentia.

The upper Paleozoic Maritimes Basin comprises generally flat-lying terrestrial sedimentary rocks containing detritus eroded from the uplifted Appalachian Orogen. The Mesozoic Fundy Basin contains redbeds and basaltic volcanic rocks deposited in a rift valley formed during opening of the modern Atlantic Ocean.

TECTONIC DIVISIONS



STRATIFIED ROCKS

EARLY CRETACEOUS
eKvh Vinegar Hill Formation

EARLY JURASSIC
eJf Fundy Group (North Mountain and Scots Bay [offshore only] formations)

TRIASSIC
Tf Fundy Group (Blomidon, Echo Cove, Honeycomb Point, Lepreau, Quaco, and Wolfville [subsurface only] formations)

LATE CARBONIFEROUS
lCp Pictou Group (Clifton, Hurley Creek, Minto, Mountain View, Richibucto, Salisbury, Sunbury Creek, and Tormentine formations)
lCc Cumberland Group (Balls Lake, Boss Point, Grande Anse, Lancaster, and Tynemouth Creek formations)

EARLY CARBONIFEROUS
eCma Mabou Group (Arthurette, Beaver Harbour, Carlisle, Cumberland Hill, Enragé, Gladwyn, Hardwood Ridge, Hopewell Cape, Maringouin, Newcastle Creek, Plaster Rock, Poodiac, Queenstown, Red Pine Brook, Royal Road, Scoodic, Shepody, Shin, and Wanamaker formations)
eCpe Percé Group (Bonaventure Formation)
eCw Windsor Group (Cassidy Lake [subsurface only], Clover Hill [subsurface only], Gays River, Hillsborough, Lime-Kiln Brook, Macumber, Parleeville, Pugwash Mine [subsurface only], and Upperton formations)
eCsx Sussex Group (Briggs Cross, Dutch Valley, Gautreau, Mill Brook, Ridge Brook, Round Hill, Stilesville, and Weldon formations)

LATE DEVONIAN-EARLY CARBONIFEROUS
DCho Horton Group (Albert, Bloomfield, Fairfield, Indian Mountain, Kennebecasis, McQuade Brook, Memramcook, Perry, and Sagwa formations)

LATE DEVONIAN
lDhv Harvey Group (Cherry Mountain, Harvey Mountain, and York Mills formations)
lDpi Piskahegan Group (Bailey Rock, Big Scott Mountain, Carrow, Hoyt Station, Kleef, Little Mount Pleasant, Rothea, Scoullar Mountain, Seelys, and South Oromocto formations)

EARLY DEVONIAN
eDg Gaspé Sandstone Group (Campbellton and York Lake formations)
eDd Dalhousie Group (Archibald Settlement, Big Hole Brook, Jacquet River, Mitchell Settlement, Sunnyside, and Val d'Amour formations)
eDfo Fortin Group (Temiscouata and Tracy Brook formations)
eDt Tobique Group (Cameron Mountain, Costigan Mountain, Dorrington Hill, Dow, Greys Gulch, Hartin, and Wapske formations)

LATE SILURIAN
lSch Chaleurs Group (Bailey's Chasm, Benjamin, Bryant Point, Free Grant, Indian Point, LaPlante, New Mills, Simpsons Field, South Charlo, and West Point formations)
lSk Kingsclear Group (Burtts Corner, Flume Ridge, Gordon Meadow Brook, Sand Brook, and Taxis River formations)
lSms Mascarene Group (Cripps Stream, Cunningham Creek, and Eastport formations)
lSpe Perham Group (Canterbury, Chambord Brook, Pocowogamis, Scott Siding, and Smyrna Mills formations)

EARLY SILURIAN
eSch Chaleurs Group (Clemville, La Vieille, Limestone Point, Upsalquitch, and Weir formations)
eSk Kingsclear Group (Cross Creek, Digdeguash, and Hayes Brook formations)
eSkg Kingston Group (Bayswater, Nancy Head, Quoddy, Raymond Mountain, Waltons Lake, Westfield, and Williams Lake formations)
eSms Mascarene Group (Back Bay, Fowle Lake, Henderson Brook, Jones Creek, Letete, Lighthouse Cove, Long Reach, Oak Bay, Waweig, and Wilsons Beach formations)
eSpe Perham Group (Gounamitz Lake, Hazeldean, Jemtland, New Sweden, Siegas and Smyrna Mills formations)

LATE ORDOVICIAN-EARLY SILURIAN
OSms Mascarene Group (Goss Point Formation)
OSma Matapédia Group (White Head Formation)

LATE ORDOVICIAN
lOcal California Lake Group (Boucher Brook Formation)
lOck Cookson Group (Halls Brook and Kendall Mountain formations)
lOfo Fournier Group (Belledune River Mélange, Elmtree, and Millstream formations)
lOg Grog Brook Group (Boland Brook and Whites Brook formations)
lOma Matapédia Group (Pabos Formation)
lOmd Meductic Group (Belle Lake Formation)
lOt Tetagouche Group (Hayden Lake, Little River, Push and Be Damned, and Tomogonops formations)

MIDDLE ORDOVICIAN
mOb Balmoral Group (Goulette Brook and Popelogan formations)
mOcal California Lake Group (Canoe Landing Lake, Mount Brittain, and Spruce Lake formations)
mOck Cookson Group (Woodland Formation)
mOfo Fournier Group (Devereaux, Pointe Verte, and Sormany formations)
mOmd Meductic Group (Craig Brook Formation)
mOsb Sheephouse Brook Group (Sevogle River and Slacks Lake formations)
mOt Tetagouche Group (Flat Landing Brook, Hayden Lake, Little River, Nepisiguit Falls, and Push and be Damned formations)

EARLY ORDOVICIAN
eOck Cookson Group (Calais Formation)
eOmd Meductic Group (Eel River, Oak Mountain, and Porten Road formations)
eOm Miramichi Group (Knights Brook and Patrick Brook formations)
eOsb Sheephouse Brook Group (Clearwater Stream Formation)
eOt Tetagouche Group (Turnbull Mountain Formation)
eOw Woodstock Group (Bright Eye Brook Formation)

LATE CAMBRIAN-EARLY ORDOVICIAN
€Om Miramichi Group (Chain of Rocks Formation)
€Otl Trousers Lake Metamorphic Suite (Paragneisses and Amphibolites)
€Ow Woodstock Group (Baskahegan Lake Formation)

CAMBRIAN
€an Annidale Group (Carpenter Brook, East Scotch Settlement, Grant Brook, Lawson Brook, and Queen Brook formations)
€ck Cookson Group (Crocker Hill Formation)
€el Ellsworth Group (Matthews Lake and Mosquito Lake Road formations)
€sj Saint John Group (Buckmans Creek, Forest Hills, Glen Falls, Hanford Brook, King Square, Ratcliffe Brook, Rose Brook, and Silver Falls formations; also includes Early Ordovician Grassy Lake and Reversing Falls formations)

LATE NEOPROTEROZOIC-EARLY CAMBRIAN
Z€bi Belleisle Bay Group (Beulah Camp, Browns Flat, Leavitts Head, Lobster Brook, and Simpsons Island formations)
Z€cs Castalia Group (Flagg Cove, Great Duck Island, Long Pond Bay, North Head, Priest Cove, and Ross Island formations)

LATE NEOPROTEROZOIC
lZl Lorneville Group (Taylors Island and West Beach formations)
lZdh Dipper Harbour Group (Clear Lake and Round Meadow Cove formations)
lZc Coldbrook Group (Ben Lomond, Bloomsbury Mountain, Browns Lake, Burley Lake, Cedar Camp, Dolan Brook, Fletcher Brook, Hosford Brook, McBrien Lake, Saddleback Brook, Seely Beach, Silver Hill, Walton Dam, and Willow Grove formations)

MIDDLE NEOPROTEROZOIC
mZbr Broad River Group (Bennett Brook, Black River Road, Cape Spencer, Crooked Creek, East Branch Black River, Goose Creek, Gordon Falls, Hastie Hill, Hayward Brook, Hubley Hill, Little Salmon River, Pine Brook, Teahans Corner, and Toms Brook formations)
mZbk Brookville Gneiss
mZgm Grand Manan Group (Ingalls Head, Kent Island, and Thoroughfare formations)

EARLY NEOPROTEROZOIC
eZgh Green Head Group (Ashburn and Martinon formations)